

Requirements for TOF connection to STAR Trigger

1.Requirement: TOF must return to trigger within 200ns a count of the multiplicity in each crossing.

Justification: this information is used in the pretrigger for the PMD, and the PMD is essential to understanding conversion of kinetic energy to particle production.

status: unknown

2.Requirement: TOF must provide a measure of the event multiplicity that allows selection of central collisions in coincidence with information from the ZDCs.

Justification: Study of the 5% most central collisions is expected to yield the greatest information concerning new states of matter formed in heavy ion collisions. The current STAR central trigger uses a small signal in the ZDC with a large signal in the CTB to select central triggers.

status: need study of saturation in 8->1 data compression

3. Requirement: TOF must provide a multiplicity count that allows selection of peripheral collisions

Justification: peripheral collisions allow us to study new particle types and set a baseline for understanding particle production processes.

status: need study of noise in system

4. Requirement: TOF must return a multiplicity value usable in the minimum bias trigger.

Justification: Multiplicity cut is used in our min bias trigger

Status: current TOF sends values up to 12 from each "tray" equivalent 96 MRPS to trigger L0. MRPCs are grouped by 8 to feed FEE. If any of the 8 are hit, then the value of 1 is sent to trigger.

5. Requirement: TOF information must fit into existing CTB DSM tree - this means the digital signals must be available at the DSM interface boards within 420ns of the interaction

Justification: there is no plan to alter this information path

status: unknown

6. requirement: TOF hit info for each cell must come into Level2 within 200 micro-sec of the interaction

Justification: needed for charged vs neutral discrimination in the calorimeters so that electrons and photons can be identified for use in particle ID triggers. These triggers are used to enrich samples of rare particle production.

status: likely paths exist - need clarification and decision

7.Requirement: TOF VPD must send signals to level0 so that we can tighten the vertex position requirement, taking advantage of the better timing resolution of the VPD.

Justification: The current vertex cut based on ZDCs leads to 20-30% of the data being unusable because the interaction point determination has a multiplicity bias.

Status: unknown

8. Requirement: Send RHIC strobe to an input channel of the TOF TDCs.

Justification: we need to know the relative phase of the TOF and RHIC strobes to provide a way to compare TOF to BBC, ZDC, and other STAR detectors such as the wonderful new muon detector soon to be implemented.

Status: unknown